



INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

Criteria Pollutants: Ozone (O₃)

Office of Air Quality – Air Programs Branch

(317) 233-0178 • (800) 451-6027

www.idem.IN.gov

100 N. Senate Ave., Indianapolis, IN 46204

Description:

- Ozone is a gas composed of three oxygen atoms. The chemical symbol for ozone is O₃.
- Ozone occurs naturally in the stratosphere, approximately 10 to 30 miles above the Earth's surface, and forms a layer that protects life on Earth from the sun's harmful rays.
- Ozone also can form at ground level when other man-made pollutants react together in heat and sunlight. The man-made pollutants that contribute to the formation of ozone are nitrogen oxides (NO_x) and volatile organic compounds (VOCs). The major sources of NO_x and VOCs include cars, trucks, and off-road vehicles, industrial boilers, gasoline vapors, and vapors from chemical solvents.
- Ozone is known as a summertime pollutant and is most prevalent in Indiana between April 1 and September 30.

National Ambient Air Quality Standards (NAAQS) for Ozone:

- The federal Clean Air Act (CAA) requires the United States Environmental Protection Agency (U.S. EPA) to set National Ambient Air Quality Standards (NAAQS) for six "criteria" pollutants that are considered harmful to public health and the environment. The six criteria pollutants are: particulate matter, carbon monoxide, ground-level ozone, nitrogen dioxide, sulfur dioxide, and lead.
- The NAAQS set limits for the criteria pollutants in the ambient air. Limits established to protect human health are referred to as "primary standards"; limits established to prevent environmental damage are referred to as "secondary standards".
- The CAA requires periodic review of the science upon which the NAAQS are based, as well as the standards themselves. Primary and secondary NAAQS for photochemical oxidants were first established in April 1971. In 1979, the standards were revised to focus on ozone. The most recent revision to the standards was in May 2008 when U.S. EPA lowered the primary and secondary 8-hour standard.
- The primary and secondary NAAQS for ozone measured over an 8-hour period is set at 0.075 parts per million parts of air. To attain this standard, the three-year average of the fourth-highest daily maximum 8-hour average concentration from each year cannot exceed 0.075 parts per million parts of air.

Environmental Impacts:

- Ozone can affect both human health and the environment.
- Ground-level ozone can cause respiratory problems for sensitive groups, such as the very young, the elderly, or people with asthma or other chronic respiratory problems.
- Ozone damages the leaves of trees and other plants, reduces crop and forest yields and interferes with the ability of plants to produce and store food, making them more susceptible to disease, harsh weather, insects, and other pollutants.
- Ozone, commonly referred to as smog, can stain and damage stone and other materials, causing aesthetic damage to landmarks and municipal property.
- Ozone can be generated locally. Ozone can also be carried long distances in the wind, contributing to poor air quality hundreds of miles from its point of origin. This is known as regional transport.

IDEM's Role:

- The Indiana Department of Environmental Management (IDEM) is responsible for protecting human health and the environment while providing for safe industrial, agricultural, commercial, and governmental operations vital to a prosperous economy.
- IDEM is responsible for protecting air quality in Indiana through the implementation of federal, regional, and state control measures, regulations, and ambient air monitoring.
- IDEM works to protect and improve air quality by monitoring air quality, issuing advisories for the public when air quality may be unhealthy, and educating citizens and businesses about their roles in improving air quality.



A State that Works

- IDEM announces Air Quality Action Days when state meteorologists predict conditions will be conducive to the formation of ground-level ozone. These advisories are intended to caution sensitive groups to limit their exposure and encourage all citizens to limit activities contributing to ozone formation.
- IDEM's Office of Air Quality issues permits to businesses that detail restrictions on emissions that contribute to the formation of ground-level ozone.
- Indiana operates an extensive monitoring network to gather data on levels of criteria air pollutants in the ambient air. The data is used to determine if Indiana's air meets the NAAQS. Areas within Indiana which meet air quality standards are classified as "attainment" or, if they exceed the air quality standards they are classified as "nonattainment".
- For areas not achieving (attaining) air quality standards, IDEM will work to help communities implement programs to achieve the standards as quickly as possible.
- Data from Indiana's air monitoring network is also used to identify trends in Indiana's air quality and to provide information for U.S. EPA's AIRNow website and the National Air Quality Index (AQI), a daily air quality report.

Citizen's Role:

There are a number of actions every citizen can take to reduce their contribution or exposure to ozone:

- Stay informed about air quality by monitoring IDEM's website (www.idem.IN.gov) and be alert for air quality forecasts from your local news.
- When Air Quality Action Day advisories are issued for your area, follow the tips to limit exposure for yourself or others who may be affected.
- Take action to prevent harmful emissions that contribute to ground-level ozone pollution, such as:
 - Carpool, walk, bike, or use public transportation when possible.
 - Avoid excess idling and drive-thru windows.
 - Consolidate trips and avoid fast-starts.
 - Postpone mowing the lawn or using gasoline-powered garden equipment until late evening.
 - Use energy efficient lighting and appliances recommended by the Energy Star Program. (www.energystar.gov).
 - Turn off appliances and lights when not in use, to reduce emissions from energy production.
 - Adjust your thermostat by turning it up in the summer and down in the winter to reduce emissions from energy production.
 - Recycle to reduce the emissions related to producing paper, plastic, glass bottles, aluminum cans, and cardboard.

Additional Information:

- For more information on ozone, please visit these IDEM websites:
 - www.IN.gov/idem/airquality/2343.htm for ozone-specific information and information for other criteria pollutants for Indiana.
 - www.IN.gov/idem/airquality/2489.htm for air quality monitoring data for ozone and other pollutants.
 - www.IN.gov/idem/airquality/2384.htm for a map of ozone monitors and for the most recent ozone emission readings.
 - www.IN.gov/idem/airquality/2424.htm for the nonattainment status for Indiana counties or townships.
- To find daily air quality forecasts, visit IDEM's SmogWatch website at www.smogwatch.IN.gov.
- To receive e-mail notices when Air Quality Action Days are issued, visit IDEM's SmogWatch website at www.smogwatch.IN.gov and follow the instructions under SmogWatch E-mail Notices.
- For further information on the NAAQS, visit U.S. EPA's website at <http://epa.gov/air/criteria.html>.
- For questions and concerns, feel free to call IDEM's Office of Air Quality at (317) 233-0178 or (800) 451-6027, ext. 3-0178.